

**SOAP-FILLABLE BRUSH WITH SEALED ACTUATOR****Background of the Invention**

The present invention relates to cleaning devices and, in particular, to such devices which carry and dispense cleaning fluid. The invention relates in particular to a soap-dispensing brush.

Prior soap-dispensing cleaning devices are known, which include a housing defining a soap-containing reservoir, a wall of the housing carrying a cleaning medium, such as a sponge, brush or the like. A valve assembly dispenses fluid from the reservoir to the cleaning medium. In one such device the valve assembly includes a stem which extends upwardly through an opening in a cap which closes the upper end of the reservoir. The portion of the stem which extends upwardly through the cap defines a manually-actuated push button for opening the valve, which is spring-biased to a normally closed position. While such devices operate well in dispensing soap to the cleaning medium, they tend to leak cleaning fluid through the push button opening in the cap if the device is inverted or turned on its side, either in use or in storage or the like.

It is also known to provide cleaning devices with frictional gripping surfaces at hand-engaging portions.

**Summary of the Invention**

It is a general object of the invention to provide an improved fluid-containing cleaning device which avoids the

disadvantages of prior such devices while affording additional structural and operating advantages.

An important feature of the invention is the provision of a fluid-containing cleaning device of the type set forth, which has a manually-actuated, fluid-dispensing valve assembly which does not leak.

In connection with the foregoing feature, another feature of the invention is the provision of a device of the type set forth, which can be used or stored in any orientation without danger of leakage.

Still another feature of the invention is the provision of a device of the type set forth, which is of simple and economical construction.

Certain ones of these and other features of the invention may be attained by providing a fluid-containing cleaning device comprising: an open-top housing defining a fluid reservoir, a scrubbing medium carried by the housing, a valve carried by the housing for providing communication between the reservoir and the scrubbing medium and having a valve stem extending through the reservoir, a cap for closing the open top of the housing and having an opening therein for receiving the valve stem, and a flexible and resilient seal member covering the cap and providing a fluid-tight seal around the opening therein while accommodating manual actuation of the valve stem from above the cap.

The invention consists of certain novel features and a

combination of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the details may be made without departing from the spirit, or sacrificing any of the advantages of the present invention.

### Brief Description of the Drawings

For the purpose of facilitating an understanding of the invention, there is illustrated in the accompanying drawings a preferred embodiment thereof, from an inspection of which, when considered in connection with the following description, the invention, its construction and operation, and many of its advantages should be readily understood and appreciated.

FIG. 1 is a front elevational view of a cleaning device in accordance with the present invention;

FIG. 2 is a top plan view of the cleaning device of FIG. 1;

FIG. 3 is a front perspective view of the cleaning device of FIG. 1;

FIG. 4 is a perspective view illustrating opening of the cap of the cleaning device of FIG. 1;

FIG. 5 is an enlarged view in vertical section taken along the line 5-5 in FIG. 1;

FIG. 6 is a view similar to FIG. 5, illustrating the valve assembly in its open condition;

FIG. 7 is an enlarged, exploded, sectional view of the device of FIG. 1; and

FIG. 8 is a further enlarged, fragmentary view of a portion of the cleaning device of FIG. 6.

**Description of the Preferred Embodiment**

Referring to FIGS. 1-4 and 7, there is illustrated a fluid-containing cleaning device, generally designated by the numeral 10, constructed in accordance with and embodying the features of the present invention. The cleaning device 10 is in the nature of a liquid soap-fillable brush, but it will be appreciated that the present invention is applicable to cleaning devices with other types of cleaning media, such as sponges or the like. The cleaning device 10 has a housing 11 which includes a generally cylindrical side wall 12, preferably formed of a transparent or translucent material, such as a suitable plastic. The side wall 12 has a radially inwardly projecting circumferential depression 13 formed therein intermediate the upper and lower ends thereof, which can serve as a finger grip to facilitate grasping of the device by a user. The side wall 12 is provided at its upper end with a circumferential groove 14, which defines an annular shoulder surface 14a and an annular lip 15 along the upper end edge. Four short rectangular lugs 16 project radially outwardly from the upper end of the lip 15 at equiangularly spaced locations. An annular groove 17 is formed in the lower end of the side wall 12 and is adapted to receive therein an annular flange 19 projecting axially from the annular end face 18 of a base wall 20, which may be formed of a suitable plastic material.

The base wall 20 is fixedly secured to the side wall 12 for closing the lower end thereof by any suitable means, such as by ultrasonic welding.

The base wall 20 has an axial bore 21 formed therethrough (FIG. 7) which is provided with an enlarged-diameter counterbore 22 at its inner end and, at its outer end, with a counterbore 23 having a frustoconical inner end wall 24. Fixedly secured to the outer surface of the base wall 20 is a suitable cleaning medium 25 which, in the illustrated embodiment, comprises a plurality of brush bristles, which may be fixed in sockets 26 in the base wall 20 by any suitable means. It will be appreciated that the axial bore 21 provides communication between the interior of the housing 11 and the cleaning medium 25.

Referring in particular to FIGS. 5-7, the axial bore 21 is closeable by a valve assembly 30 which includes an elongated valve stem 31 extending axially through the housing 11 and through the axial bore 21, being provided at its distal end with a conical head 32. A valve member in the form of a flexible and resilient O-ring seal 34 is seated in a circumferential groove 33 in the stem 31 immediately above the head 32. The stem 31 preferably has a reduced-diameter neck portion 35 adjacent to the head 32, which is surrounded by a helical compression spring 36, one end of which is seated in the counterbore 23 and the other end of which is seated against a radially outwardly extending annular flange 37 on the stem 31.

The upper end 38 of the stem 31 is coupled to an actuator button 40. More specifically the button 40 has an arcuate head 41, which may be generally part-spherical in shape, and which is provided centrally of its inner surface with a depending cylindrical socket 42 which receive the upper end 38 of the stem 31 and may be fixed thereto by any suitable means. The head 41 of the actuator button 40 is provided around its periphery with a depending, generally frustoconical skirt 43.

In use, it will be appreciated that the spring 36 resiliently biases the valve assembly 30 to a normal closed condition, illustrated in FIG. 5, wherein the O-ring seal 34 seats against the wall 24 of the counterbore 23 and cooperates with the stem 31 to seal the opening defined by the axial bore 21. When the stem 31 is depressed by use of the actuator button 40, the O-ring seal 34 unseats, as illustrated in FIG. 6, permitting liquid soap or other fluid to flow through the axial bore 21 to the cleaning medium 25, the outward movement of the stem 31 being limited by engagement of the flange 37 with the inner surface of the housing base wall 20. Preferably, the stem 31 has a length such that, in its normal rest position illustrated in FIG. 5, the upper end 38 and the attached actuator button 40 project outwardly beyond the upper end of the side wall 12.

The device 10 also includes a cap 45 which is generally part-dome-shaped with a generally cylindrical skirt portion 46,

which is provided adjacent to its distal edge with four equiangularly spaced, generally L-shaped recesses 47 in its inner surface. Disposed centrally of the cap 45 is an axially inwardly extending cylindrical neck 48 which defines a relatively large-diameter axial opening 49 through the cap 45, the opening 49 being dimensioned so as to receive the actuator button 40 therein. Preferably, the neck 48 is so dimensioned that, when the valve assembly 30 is in its normal rest condition, the frustoconical skirt 43 of the actuator button 40 engages the inner end of the neck 48 to close the opening 49, the actuator button 40 being shaped and dimensioned so that it projects axially outwardly beyond the outer surface of the cap 45, as can best be seen in FIG. 5, for easy actuation by the fingers or palm of the user's hand to open the valve assembly 30.

While the skirt 43 of the actuator button 40 preferably engages the neck 48, it does not provide a fluid-tight seal therewith. Thus, it is a significant aspect of the present invention that there is also provided a flexible and resilient cover or seal member 50, which covers the entire outer surface of the cap 45, including the opening 49. The cover 50 is preferably formed of a suitable elastomeric material and is fixedly secured to the outer surface of the cap 45 by any suitable means, such as insert molding. The cover 50 is preferably molded with a central dome 51 and an arcuate annular skirt portion 52 with a circular groove 53 formed therebetween in the outer surface of the cover

50 to facilitate flexing of the dome 51 relative to the skirt portion 52. Referring also to FIG. 8, the skirt portion 52 extends beyond the lower edge of the cap skirt portion 46 and is of reduced thickness to define an annular gasket lip 54.

It can be seen that the cover 50 completely covers the actuator button 40 and the opening 49 in which the actuator button 40 is disposed, thereby effectively preventing the escape of fluid through the opening 49. Furthermore, the cover 50 which may be formed of an elastomeric material, such as that sold under the trademark "SANTOPRENE", also provides a frictional non-slip surface to improve the grip by a user's hand.

In use, the cap 45 is fitted onto the upper end of the housing 11, with the lugs 16 received in the recesses 47, the L-shape of which accommodates a slight rotation of the cap 45 relative to the side wall 12 in a known manner, to securely hold the cap 45 in place for cooperation with the housing 11 to define and close a fluid reservoir 55, which is fillable with a suitable cleaning fluid, such as a liquid soap 56. It will be appreciated that the cap 45 could also be removably attached to the housing 11 by other means, such as a threaded coupling. The flexible and resilient nature of the dome 51 of the cover 50 accommodates easy actuation of the actuator button 40 from above the cap 45, as illustrated in FIGS. 5 and 6, while maintaining an effective seal of the opening 49. When the cap 45 is secured in place, the cover gasket lip 54 engages the shoulder surface 14a (FIG. 8) to



form a fluid-tight seal between the cap 45 and the housing 11.

From the foregoing, it can be seen that there has been provided an improved fluid-containing cleaning device which is refillable with and dispenses a suitable cleaning fluid, without risk of leakage in use.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from the invention in its broader aspects. Therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only and not as a limitation. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective based on the prior art.